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Date June 15, 2004

To Examiner Linzy T. McCartney
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From Diana Bradley
US Patent Paralegal/Case Manager

Re P440 Rendering Characters
Serial No. 09/739,587
Our Ref.: 07844-476001

Number of pages
including this page 29

Message Enclosed is a copy of the RCE, formal drawings and related papers as filed on December 17, 2003, along with a copy of the return receipt postcard stamped by OIPE on December 22, 2004. Thank you for your assistance in this matter

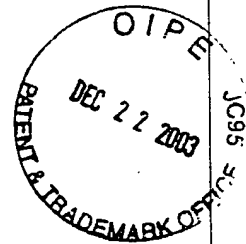
~Diana

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DAB
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Attorney's Docket No. 07844-476001	Express Mail Label No.	Mailing Date December 17, 2003
Application No. 09/739,587	Filing Date December 15, 2000	Attorney/Secretary Init RSB/BLB/vzl
Title of the Invention HINTED STEM PLACEMENT ON HIGH-RESOLUTION PIXEL GRID		
Applicant Terence S. Dowling and R. David Arnold		
Client Reference No. P440		
Enclosures ·Request for Continued Examination (RCE) Transmittal (1 page) ·Preliminary Amendment (14 pages) with attached Drawings (formal, 5 sheets) ·Information Disclosure Statement (1 pages) ·Form PTO-1449 (1 page) ·Documents listed on the Form PTO-1449 (3 documents) Limited Recognition Under 37 CFR Section 10.9(b) (1 page) This return postcard – FEES BEING CHARGED		

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DEC 22 2003

Attorney's Docket No. 07844-476001	Express Mail Label No.	Mailing Date December 17, 2003
Application No. 09/739,587	Filing Date December 15, 2000	Attorney/Secretary Init RSB/BLB/vzl

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Title of the Invention

HINTED STEM PLACEMENT ON HIGH-RESOLUTION
PIXEL GRID

Applicant

Terence S. Dowling and R. David Arnold

Client Reference No.

P440

Enclosures

·Request for Continued Examination (**RCE**)Transmittal (1 page)

·Preliminary Amendment (14 pages) with attached Drawings
(formal, 5 sheets)

·Information Disclosure Statement (1 pages)

·Form PTO-1449 (1 page)

·Documents listed on the Form PTO-1449 (3 documents)

Limited Recognition Under 37 CFR Section 10.9(b) (1 page)

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Date June 15, 2004

To Examiner Linzy T. McCartney
Group 2671
Telephone: (703) 605-0745

Facsimile number 07844-47600001 / (703) 746-9229

From Diana Bradley
US Patent Paralegal/Case Manager

Re P440 Rendering Characters
Serial No. 09/739,587
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~Diana

**Request
For
Continued Examination (RCE)
Transmittal**

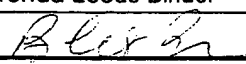
Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

<i>Application Number</i>	09/739,587
<i>Filing Date</i>	December 15, 2000
<i>First Named Inventor</i>	Terence S. Dowling
<i>Group Art Unit</i>	2671
<i>Examiner Name</i>	Linzy T. McCartney
<i>Attorney Docket Number</i>	07844-476001

This is a Request for Continued Examination (RCE) under 37 C.F.R. §1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

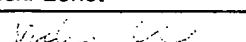
- Submission required under 37 C.F.R. §1.114** Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s)
 - ☐ Previously submitted. If a final Office action is outstanding, any amendment filed after the final Office action may be considered as a submission even if this box is not checked.
 - ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
 - ☐ Other _____
 - ☒ Enclosed
 - ☒ Preliminary Amendment
 - ☐ Affidavit(s)/Declaration(s)
 - ☒ Information Disclosure Statement (IDS)
 - ☐ Other _____
- Miscellaneous**
 - ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. §1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. §1.17(i) required)
 - ☐ Other _____
- Fee** The RCE fee under 37 C.F.R. §1.17(e) is required by 37 C.F.R. §1.114 when the RCE is filed.
 - ☒ The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 06-1050
 - ☒ RCE fee required under 37 CFR 1.17(e)
 - ☐ Extension of time fee (37 CFR 1.136 and 1.17)
 - ☒ Other Any deficiencies
 - ☐ Check in the amount of \$ _____ enclosed
 - ☐ Payment by credit card (Form PTO-2038 enclosed)

SIGNATURE OF APPLICANT, ATTORNEY OR AGENT REQUIRED

<i>Name (Print/Type)</i>	Brenda Leeds Binder	<i>Limited Recognition under 37 CFR § 10.9(b)</i>
<i>Signature</i>		<i>Date</i> Dec 17/03

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

<i>Name (Print/Type)</i>	Vicki Lorist
<i>Signature</i>	 <i>Date</i> 12-17-03

Brenda Leeds Binder has been given limited recognition under 37 CFR § 10.9(b) as an employee of the Fish & Richardson PC law firm to prepare and prosecute patent applications wherein the patent applicant is a client of Fish & Richardson PC and the attorney or agent of record in the applications is a registered practitioner who is a member of Fish & Richardson, which is the case in the present application. A copy of the Limited Recognition document, which expires July 16, 2004, is attached hereto.


**BEFORE THE OFFICE OF ENROLLMENT AND DISCIPLINE
UNITED STATES PATENT AND TRADEMARK OFFICE**

LIMITED RECOGNITION UNDER 37 CFR § 10.9(b)

Brenda Leeds Binder is hereby given limited recognition under 37 CFR § 10.9(b) as an employee of the Fish & Richardson P.C. law firm to prepare and prosecute patent applications wherein the patent applicant is the client of the Fish & Richardson P.C. law firm, and the attorney or agent of record in the applications is a registered practitioner who is a member of the Fish & Richardson P.C. law firm. This limited recognition shall expire on the date appearing below, or when whichever of the following events first occurs prior to the date appearing below: (i) Brenda Leeds Binder ceases to lawfully reside in the United States, (ii) Brenda Leeds Binder's employment with the Fish & Richardson P.C. law firm ceases or is terminated, or (iii) Brenda Leeds Binder ceases to remain or reside in the United States on a H1-B visa.

This document constitutes proof of such recognition. The original of this document is on file in the Office of Enrollment and Discipline of the United States Patent and Trademark Office.

Expires: July 16, 2004



Harry I. Moatz

Director of Enrollment and Discipline

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Terence S. Dowling, et al. Art Unit : 2671
Serial No. : 09/739,587 Examiner : Linzy T. McCartney
Filed : December 15, 2000
Title : HINTED STEM PLACEMENT ON HIGH-RESOLUTION PIXEL GRID

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Prior to examination, please amend the application as indicated on the following pages.

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

I hereby certify under 37CFR §1.8(a) that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated below and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

12-17-03
Date of Deposit
Vicki Lorist
Vicki Lorist

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented) A system for rendering a character for display in grayscale on a grayscale output device, comprising:

means for defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids defining edges of the cells;

means for placing a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that are placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

stem aligner means for processing the stem before rendering the character for output on the output device, the stem aligner means comprising means for performing a black-edge hinted stem placement policy, including,

means for rounding the stem width to the width of an integral number of fine cells;

means for determining the stem width; and

means for, if the stem width is at least one coarse grid cell, moving the stem with rounded width a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

2. (Original) The system of claim 1, wherein:

the number of fine cells per coarse cell is determined according to the number of

grayscale levels that can be produced by a pixel of the output device.

3. (Original) The system of claim 1, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

4. (Original) The system of claim 1, wherein:

the stem aligner means further comprises means for performing an unbiased-stems hinted stem placement policy.

5. (Previously Presented) The system of claim 4, wherein:

the means for performing an unbiased-stems policy comprise:
means for rounding the stem width to the width of an integral number of fine cells;
means for determining a minimum number of coarse cells that can be spanned by the rounded width of the stem; and
means for determining whether the stem spans more than the minimum number of coarse cells and, if it does, for moving the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

6. (Previously Presented) A system for rendering a character for display in grayscale on a grayscale output device, comprising:

means for defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells;

means for placing a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

stem aligner means for processing the stem before rendering the character for output on the output device, the stem aligner means comprising means for performing an unbiased-stems hinted stem placement policy, wherein the unbiased-stems policy considers stem spread when determining stem placement.

7. (Original) The system of claim 6, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

8. (Original) The system of claim 6, wherein:

the number of fine cells per coarse cell is determined according to the number of grayscale levels that can be produced by a pixel of the output device.

9. (Original) The system of claim 6, wherein:

the stem aligner means further comprises means for performing a black-edge hinted stem placement policy.

10. (Previously Presented) A method for processing a stem of a character outline, comprising:

selecting a hinted stem placement policy from a set of policies comprising at least either a black-edge policy or an unbiased-stems policy, where a black edge policy considers stem width when determining stem placement and an unbiased-stems policy considers stem spread when determining stem placement;

placing a character defined by a font program with reference to a coarse grid and an overlapping fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

processing the stem before rendering the character for output on the output device in accordance with the selected policy,

wherein, processing the stem in accordance with the black-edge policy includes:

rounding the stem width to the width of an integral number of fine cells;

determining the stem width; and

if the stem width is at least one coarse cell, moving the stem with rounded width a minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

11. (Cancelled)

12. (Original) The method of claim 10, further comprising processing the stem in accordance with a unbiased-stems policy by:

rounding the stem width to the width of an integral number of fine cells;

determining a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

determining whether the stem spans more than the minimum number of coarse cells and, if it does, for moving the stem a minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

13. (Original) The method of claim 10, wherein the set of policies comprises both a black-edge policy and an unbiased-stems policy.

14. (Original) The method of claim 13, wherein the set of policies further comprises a hard-edge policy and a soft-edge policy.

15. (Original) The method of claim 10, wherein the policy is specifically selected for vertical stems or horizontal stems.

16. (Original) The method of claim 10, wherein the policy is selected for both vertical stems and horizontal stems.

17. (Original) The method of claim 10, further comprising:

selecting a first policy for vertical stems and a different second policy for horizontal stems.

18. (Currently Amended) A computer program product, tangibly stored on a computer-readable

medium, for rendering a character for display in grayscale on a grayscale output device, the product comprising instructions operable to cause a programmable processor to:

define a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids defining edges of the cells;

place a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that are placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

perform a black-edge hinted stem placement policy, wherein instructions to perform a black-edge hinted stem placement policy comprise instructions to:

round the stem width to the width of an integral number of fine cells;
determine the stem width; and

if the stem width is at least one coarse cell, move the stem with rounded width a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

19. (Original) The product of claim 18, wherein:

the number of fine cells per coarse cell is determined according to the number of grayscale levels that can be produced by a pixel of the output device.

20. (Original) The product of claim 18, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

21. (Original) The product of claim 18, further comprising instructions to:

perform an unbiased-stems hinted stem placement policy.

22. (Previously Presented) The product of claim 18, wherein:

the instructions to perform an unbiased-stems policy comprise instructions to:
round the stem width to the width of an integral number of fine cells;
determine a minimum number of coarse cells that can be spanned by the rounded
width of the stem; and

determine whether the stem spans more than the minimum number of coarse cells
and, if it does, move the stem a minimum distance so that at least one of the stem hint edges
aligns with a parallel coarse cell edge.

23. (Previously Presented) A computer program product, tangibly stored on a computer-readable
medium, for rendering a character for display in grayscale on a grayscale output device, the
product comprising instructions operable to cause a programmable processor to:

define a coarse grid of cells, each coarse cell corresponding to an output device grayscale
pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said
coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids
defining edges of the cells;

place a character defined by a font program with reference to the coarse grid and fine
grid, the character having a stem hinted with two parallel edges that are placed with reference to
the grids when the character is so placed, the stem hint edges being separated by a stem width;
and

perform an unbiased-stems hinted stem placement policy, wherein the unbiased-stems
policy considers stem spread when determining stem placement.

24. (Original) The product of claim 23, further comprising instructions to:

perform a black-edge hinted stem placement policy.

25. (Previously Presented) A computer program product, tangibly stored on a computer-readable
medium, for processing a stem of a character outline, the product comprising instructions
operable to cause a programmable processor to:

select a hinted stem placement policy from a set of policies comprising at least either a
black-edge policy or an unbiased-stems policy, where a black-edge policy considers stem width

when determining stem placement and an unbiased-stems policy considers stem spread when determining stem placement;

place a character defined by a font program with reference to a coarse grid and an overlapping fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

process the stem before rendering the character for output on the output device in accordance with the selected policy,

wherein, instructions to process the stem in accordance with a black-edge policy, include instructions to:

round the stem width to the width of an integral number of fine cells;

determine the stem width; and

if the stem width is at least one coarse cell, move the stem with rounded width a minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

26. (Cancelled)

27. (Original) The product of claim 25, further comprising instructions to:

process the stem in accordance with a unbiased-stems policy, including instructions to:

round the stem width to the width of an integral number of fine cells;

determine a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

determine whether the stem spans more than the minimum number of coarse cells and, if it does, move the stem a minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

28. (Original) The product of claim 25, wherein the set of policies comprises both a black-edge policy and an unbiased-stems policy.

29. (Original) The product of claim 28, wherein the set of policies further comprises a hard-edge

policy and a soft-edge policy.

30. (Original) The product of claim 25, wherein the policy is specifically selected for vertical stems or horizontal stems.

31. (Original) The product of claim 25, wherein the policy is selected for both vertical stems and horizontal stems.

32. (Currently Amended) The product of claim 25, further comprising:

selecting a first policy for vertical stems and a different second policy for horizontal ~~stem~~ stems.

33. (Previously Presented) The system of claim 6, wherein the means for performing an unbiased-stems policy comprise:

means for rounding the stem width to the width of an integral number of fine cells;

means for determining a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

means for determining whether the stem spans more than the minimum number of coarse cells and, if it does, for moving the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

34. (Previously Presented) The product of claim 23, wherein instructions operable to perform an unbiased-stems hinted stem placement policy include instructions operable to:

round the stem width to the width of an integral number of fine cells;

determine a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

determine whether the stem spans more than the minimum number of coarse cells and, if it does, move the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

35. (Previously Presented) Method for rendering a character for display in grayscale on a

grayscale output device, comprising:

defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells;

placing a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

processing the stem before rendering the character for output on the output device including performing an unbiased-stems hinted stem placement policy, wherein the unbiased-stems policy considers stem spread when determining stem placement.

36. (Previously Presented) The method of claim 35, wherein processing the stem before rendering the character further includes performing a black-edge hinted stem placement policy.

37. (Previously Presented) The method of claim 35, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

38. (Previously Presented) The method of claim 35, wherein:

the number of fine cells per coarse cell is based on the number of grayscale levels that can be produced by a pixel of the output device.

39. (Previously Presented) A method for rendering a character for display in grayscale on a grayscale output device, comprising:

defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids defining edges of the cells;

placing a character defined by a font program with reference to the coarse grid and fine

grid, the character having a stem hinted with two parallel edges that are placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

processing the stem before rendering the character for output on the output device, including performing a black-edge hinted stem placement policy, wherein performing a black-edge policy comprises:

- rounding the stem width to the width of an integral number of fine cells;
- determining the stem width; and

- if the stem width is at least one coarse cell, moving the stem with rounded width a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

40. (Previously Presented) The method of claim 39, further comprising,
performing an unbiased-stems hinted stem placement policy.

41. (Previously Presented) The method of claim 39, wherein:
performing an unbiased-stems policy comprises:

- rounding the stem width to the width of an integral number of fine cells;
- determining a minimum number of coarse cells that can be spanned by the

rounded width of the stem; and

- determining whether the stem spans more than the minimum number of coarse cells and, if it does, moving the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

42. (Previously Presented) The method of claim 39, wherein:

- the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

43. (Previously Presented) The method of claim 39, wherein:

- the number of fine cells per coarse cell is based on the number of grayscale levels that

can be produced by a pixel of the output device.

44. - 45. (Cancelled)

46. (Previously Presented) The system of claim 1, the stem aligner means further comprising:
means for, if the stem width is less than one coarse cell, performing an unbiased stems policy.

47. (Previously Presented) The method of claim 10, wherein, processing the stem in accordance with the black-edge policy further includes:

if the stem width is less than one coarse cell, performing an unbiased stems policy.

48. (Previously Presented) The computer program product of claim 18, wherein instructions to perform a black-edge hinted stem placement policy further comprise instructions to:

if the stem width is less than one coarse cell, perform an unbiased stems policy.

49. (Previously Presented) The computer program product of claim 25, wherein instructions to process the stem in accordance with a black-edge policy further include instructions to:

if the stem width is less than one coarse cell, perform an unbiased stems policy.

50. (Previously Presented) The method of claim 39, wherein performing a black-edge policy further comprises:

if the stem width is less than one coarse cell, performing an unbiased stems policy.

Applicant : Terence S. Dowling and R. David Arnold
Serial No. : 09/739,587
Filed : December 15, 2000
Page : 13 of 14

Attorney's Docket No.: 07844-476001 / P440

Amendments to the Drawings:

The attached 5 replacement sheets replace the original sheets filed with the application on December 15, 2000.

Attachments following last page of this Amendment:

Replacement Sheet (5 pages)

Applicant : Terence S. Dowling and R. David Arnold
Serial No. : 09/739,587
Filed : December 15, 2000
Page : 14 of 14

Attorney's Docket No.: 07844-476001 / P440

REMARKS

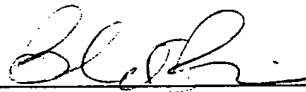
Further to the Examiner's Amendment included with the Notice of Allowance, mailed September 25, 2003, claims 18 and 32 are amended. Claim 18 is amended to include the word "edge" at the end of the last limitation, which word was omitted in the Examiner's Amendment. Claim 32 is amended to correct a typographical error, changing the word "stem" to the word "stems". No new matter is added.

Brenda Leeds Binder has been given limited recognition under 37 CFR § 10.9(b) as an employee of the Fish & Richardson PC law firm to prepare and prosecute patent applications wherein the patent applicant is a client of Fish & Richardson PC and the attorney or agent of record in the applications is a registered practitioner who is a member of Fish & Richardson, which is the case in the present application. A copy of the Limited Recognition document, which expires July 16, 2004, is attached hereto.

Please apply all charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: Dec 17/03



Brenda Leeds Binder
Limited Recognition under 37 CFR § 10.9(b)

Fish & Richardson P.C.
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Terence S. Dowling and R. David Arnold Art Unit : 2671
Examiner : Linzy T. McCartney
Serial No. : 09/739,587 Confirmation No.: 3536
Filed : December 15, 2000 Notice of Allowance Date: 5/17/2004
Title : HINTED STEM PLACEMENT ON HIGH-RESOLUTION PIXEL GRID

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 C.F.R. §1.312

Please amend the application as indicated on the following pages. This amendment is being filed concurrently with the payment of the issue fee.

CERTIFICATE OF MAILING BY EXPRESS MAIL

Express Mail Label No. EV 322524820 US

August 16, 2004

Date of Deposit

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented) A system for rendering a character for display in grayscale on a grayscale output device, comprising:

means for defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids defining edges of the cells;

means for placing a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that are placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

stem aligner means for processing the stem before rendering the character for output on the output device, the stem aligner means comprising means for performing a black-edge hinted stem placement policy, including,

means for rounding the stem width to the width of an integral number of fine cells;

means for determining the stem width; and

means for, if the stem width is at least one coarse grid cell, moving the stem with rounded width a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

2. (Original) The system of claim 1, wherein:

the number of fine cells per coarse cell is determined according to the number of grayscale levels that can be produced by a pixel of the output device.

3. (Original) The system of claim 1, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

4. (Original) The system of claim 1, wherein:

the stem aligner means further comprises means for performing an unbiased-stems hinted stem placement policy.

5. (Previously Presented) The system of claim 4, wherein:

the means for performing an unbiased-stems policy comprise:

means for rounding the stem width to the width of an integral number of fine cells;

means for determining a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

means for determining whether the stem spans more than the minimum number of coarse cells and, if it does, for moving the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

6. (Previously Presented) A system for rendering a character for display in grayscale on a grayscale output device, comprising:

means for defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells;

means for placing a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

stem aligner means for processing the stem before rendering the character for output on the output device, the stem aligner means comprising means for performing an unbiased-stems

hinted stem placement policy, wherein the unbiased-stems policy considers stem spread when determining stem placement.

7. (Original) The system of claim 6, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

8. (Original) The system of claim 6, wherein:

the number of fine cells per coarse cell is determined according to the number of grayscale levels that can be produced by a pixel of the output device.

9. (Original) The system of claim 6, wherein:

the stem aligner means further comprises means for performing a black-edge hinted stem placement policy.

10. (Previously Presented) A method for processing a stem of a character outline, comprising:

selecting a hinted stem placement policy from a set of policies comprising at least either a black-edge policy or an unbiased-stems policy, where a black edge policy considers stem width when determining stem placement and an unbiased-stems policy considers stem spread when determining stem placement;

placing a character defined by a font program with reference to a coarse grid and an overlapping fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

processing the stem before rendering the character for output on the output device in accordance with the selected policy,

wherein, processing the stem in accordance with the black-edge policy includes:

rounding the stem width to the width of an integral number of fine cells;

determining the stem width; and

if the stem width is at least one coarse cell, moving the stem with rounded width a

minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

11. (Cancelled)

12. (Original) The method of claim 10, further comprising processing the stem in accordance with a unbiased-stems policy by:

rounding the stem width to the width of an integral number of fine cells;

determining a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

determining whether the stem spans more than the minimum number of coarse cells and, if it does, for moving the stem a minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

13. (Original) The method of claim 10, wherein the set of policies comprises both a black-edge policy and an unbiased-stems policy.

14. (Original) The method of claim 13, wherein the set of policies further comprises a hard-edge policy and a soft-edge policy.

15. (Original) The method of claim 10, wherein the policy is specifically selected for vertical stems or horizontal stems.

16. (Original) The method of claim 10, wherein the policy is selected for both vertical stems and horizontal stems.

17. (Original) The method of claim 10, further comprising:

selecting a first policy for vertical stems and a different second policy for horizontal stems.

18. (Previously Presented) A computer program product, tangibly stored on a computer-readable medium, for rendering a character for display in grayscale on a grayscale output device, the product comprising instructions operable to cause a programmable processor to:

define a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids defining edges of the cells;

place a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that are placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

perform a black-edge hinted stem placement policy, wherein instructions to perform a black-edge hinted stem placement policy comprise instructions to:

round the stem width to the width of an integral number of fine cells;

determine the stem width; and

if the stem width is at least one coarse cell, move the stem with rounded width a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

19. (Original) The product of claim 18, wherein:

the number of fine cells per coarse cell is determined according to the number of grayscale levels that can be produced by a pixel of the output device.

20. (Original) The product of claim 18, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

21. (Original) The product of claim 18, further comprising instructions to:

perform an unbiased-stems hinted stem placement policy.

22. (Previously Presented) The product of claim 18, wherein:

the instructions to perform an unbiased-stems policy comprise instructions to:

round the stem width to the width of an integral number of fine cells;

determine a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

determine whether the stem spans more than the minimum number of coarse cells and, if it does, move the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

23. (Previously Presented) A computer program product, tangibly stored on a computer-readable medium, for rendering a character for display in grayscale on a grayscale output device, the product comprising instructions operable to cause a programmable processor to:

define a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids defining edges of the cells;

place a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that are placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

perform an unbiased-stems hinted stem placement policy, wherein the unbiased-stems policy considers stem spread when determining stem placement.

24. (Original) The product of claim 23, further comprising instructions to:

perform a black-edge hinted stem placement policy.

25. (Previously Presented) A computer program product, tangibly stored on a computer-readable medium, for processing a stem of a character outline, the product comprising instructions operable to cause a programmable processor to:

select a hinted stem placement policy from a set of policies comprising at least either a black-edge policy or an unbiased-stems policy, where a black-edge policy considers stem width when determining stem placement and an unbiased-stems policy considers stem spread when determining stem placement;

place a character defined by a font program with reference to a coarse grid and an overlapping fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

process the stem before rendering the character for output on the output device in accordance with the selected policy,

wherein, instructions to process the stem in accordance with a black-edge policy, include instructions to:

round the stem width to the width of an integral number of fine cells;

determine the stem width; and

if the stem width is at least one coarse cell, move the stem with rounded width a minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

26. (Cancelled)

27. (Original) The product of claim 25, further comprising instructions to:

process the stem in accordance with a unbiased-stems policy, including instructions to:

round the stem width to the width of an integral number of fine cells;

determine a minimum number of coarse cells that can be spanned by the rounded width of the stem; and

determine whether the stem spans more than the minimum number of coarse cells and, if it does, move the stem a minimum distance so that at least one of the stem edges aligns with a parallel coarse cell edge.

28. (Original) The product of claim 25, wherein the set of policies comprises both a black-edge policy and an unbiased-stems policy.

29. (Original) The product of claim 28, wherein the set of policies further comprises a hard-edge policy and a soft-edge policy.

30. (Original) The product of claim 25, wherein the policy is specifically selected for vertical stems or horizontal stems.

31. (Original) The product of claim 25, wherein the policy is selected for both vertical stems and horizontal stems.

32. (Previously Presented) The product of claim 25, further comprising:
selecting a first policy for vertical stems and a different second policy for horizontal stems.

33. (Previously Presented) The system of claim 6, wherein the means for performing an unbiased-stems policy comprise:
means for rounding the stem width to the width of an integral number of fine cells;
means for determining a minimum number of coarse cells that can be spanned by the rounded width of the stem; and
means for determining whether the stem spans more than the minimum number of coarse cells and, if it does, for moving the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

34. (Previously Presented) The product of claim 23, wherein instructions operable to perform an unbiased-stems hinted stem placement policy include instructions operable to:
round the stem width to the width of an integral number of fine cells;
determine a minimum number of coarse cells that can be spanned by the rounded width of the stem; and
determine whether the stem spans more than the minimum number of coarse cells and, if it does, move the stem a minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell edge.

35. (Previously Presented) Method for rendering a character for display in grayscale on a grayscale output device, comprising:

defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells;

placing a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that is placed with reference to the grids when the character is so placed, the stem hint edges being separated by a stem width; and

processing the stem before rendering the character for output on the output device including performing an unbiased-stems hinted stem placement policy, wherein the unbiased-stems policy considers stem spread when determining stem placement.

36. (Previously Presented) The method of claim 35, wherein processing the stem before rendering the character further includes performing a black-edge hinted stem placement policy.

37. (Previously Presented) The method of claim 35, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid ratio.

38. (Previously Presented) The method of claim 35, wherein:

the number of fine cells per coarse cell is based on the number of grayscale levels that can be produced by a pixel of the output device.

39. (Previously Presented) A method for rendering a character for display in grayscale on a grayscale output device, comprising:

defining a coarse grid of cells, each coarse cell corresponding to an output device grayscale pixel, and a high-resolution grid of fine cells, the high-resolution grid being aligned with said coarse grid so that each coarse cell includes an integer number of undivided fine cells, the grids defining edges of the cells;

placing a character defined by a font program with reference to the coarse grid and fine grid, the character having a stem hinted with two parallel edges that are placed with reference to

the grids when the character is so placed, the stem hint edges being separated by a stem width;
and

processing the stem before rendering the character for output on the output device,
including performing a black-edge hinted stem placement policy, wherein performing a
black-edge policy comprises:

rounding the stem width to the width of an integral number of fine cells;

determining the stem width; and

if the stem width is at least one coarse cell, moving the stem with rounded width a
minimum distance so that at least one of the stem hint edges aligns with a parallel coarse cell
edge.

40. (Previously Presented) The method of claim 39, further comprising,
performing an unbiased-stems hinted stem placement policy.

41. (Currently Amended) The method of claim [39] 40, wherein:

performing an unbiased-stems hinted stem placement policy comprises:

rounding the stem width to the width of an integral number of fine cells;

determining a minimum number of coarse cells that can be spanned by the
rounded width of the stem; and

determining whether the stem spans more than the minimum number of coarse
cells and, if it does, moving the stem a minimum distance so that at least one of the stem hint
edges aligns with a parallel coarse cell edge.

42. (Previously Presented) The method of claim 39, wherein:

the number of fine cells per coarse cell is determined by a single, client-selected grid
ratio.

43. (Previously Presented) The method of claim 39, wherein:

the number of fine cells per coarse cell is based on the number of grayscale levels that
can be produced by a pixel of the output device.

44. - 45. (Cancelled)

46. (Previously Presented) The system of claim 1, the stem aligner means further comprising:
means for, if the stem width is less than one coarse cell, performing an unbiased stems policy.

47. (Previously Presented) The method of claim 10, wherein, processing the stem in accordance with the black-edge policy further includes:

if the stem width is less than one coarse cell, performing an unbiased stems policy.

48. (Previously Presented) The computer program product of claim 18, wherein instructions to perform a black-edge hinted stem placement policy further comprise instructions to:

if the stem width is less than one coarse cell, perform an unbiased stems policy.

49. (Previously Presented) The computer program product of claim 25, wherein instructions to process the stem in accordance with a black-edge policy further include instructions to:

if the stem width is less than one coarse cell, perform an unbiased stems policy.

50. (Previously Presented) The method of claim 39, wherein performing a black-edge policy further comprises:

if the stem width is less than one coarse cell, performing an unbiased stems policy.

Applicant : Terence S. Dowling and R. David Arnold
Serial No. : 09/739,587
Filed : December 15, 2000
Page : 13

Attorney's Docket No. 07844-476001

REMARKS

Claim 41 has been amended to correct a typographical error. Claim 41 as amended depends from claim 40, which depends from claim 39. As previously written, claim 41 depended from directly from claim 39 and included a wherein clause referencing an "unbiased-stems policy", which was not included in the independent claim 39, causing an antecedent basis problem. Dependent claim 40 does include a reference to an "unbiased-stems hinted placement policy". Applicant asks that all claims be allowed in view of the amendment to the claims.

Brenda Leeds Binder has been given limited recognition under 37 CFR § 10.9(b) as an employee of the Fish & Richardson PC law firm to prepare and prosecute patent applications wherein the patent applicant is a client of Fish & Richardson PC and the attorney or agent of record in the applications is a registered practitioner who is a member of Fish & Richardson, which is the case in the present application. A copy of the Limited Recognition document, which expires December 1, 2004, is attached hereto.

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Applicant : Terence S. Dowling and R. David Arnold Art Unit : 2671
Examiner : Linzy T. McCartney
Serial No. : 09/739,587
Filed : December 15, 2000
Title : HINTED STEM PLACEMENT ON HIGH-RESOLUTION PIXEL GRID

INFORMATION DISCLOSURE STATEMENT

This filing is being made with the filing of a Request for Continued Examination. No fee is required.

Respectfully submitted,

Date: Dec 19/03

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Limited Recognition under 37 CFR § 10.9(b)

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Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney's Docket No. 07844-476001	Application No. 09/739,587
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant Terence S. Dowling and R. David Arnold	
		Filing Date December 15, 2000	Group Art Unit 2671

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	AA	4,907,282	03/06/90	Daly, et al.			
	AB						
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	AL	WO 94/06094	03/17/94	PCT				
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁵ :

G06F 15/72, G09G 5/24

A1

(11) International Publication Number:

WO 94/06094

(43) International Publication Date:

17 March 1994 (17.03.94)

(21) International Application Number: PCT/US93/07956

(22) International Filing Date: 24 August 1993 (24.08.93)

(30) Priority data:

07-937,962

28 August 1992 (28.08.92)

US

(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

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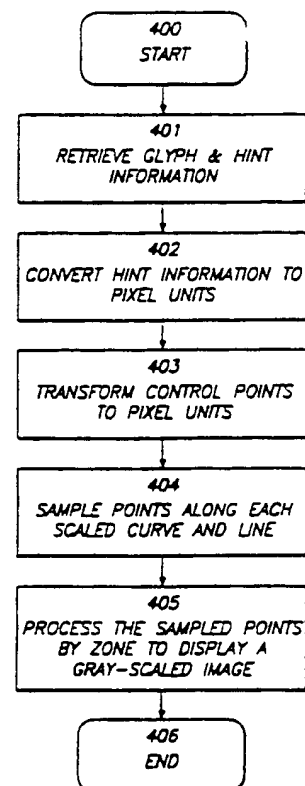
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With international search report.

(54) Title: GLYPH RASTERIZATION METHOD COMBINING ANTI-ALIASING AND GRID FITTING

(57) Abstract

A method for rasterizing ideal glyph representations provides improved clarity and readability for Chinese and Japanese glyphs. The preferred method advantageously combines anti-aliasing and grid fitting techniques for generating images and comprises the steps of: obtaining the ideal glyph representations and hints, converting the hint information from font units of the abstract coordinate space to pixel units, transforming the control points to pixel units using the hint information to produce a series of scaled line segments and curves, sampling points at intervals along each curve and line segment, and processing the sampled points to determine the fractional coloring for each pixel and to produce sharper transitions at those points of the glyph that have been indicated to be of aesthetic importance.





INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁵:

G09G 5/28, G06K 15/02

A1

(11) International Publication Number:

WO 94/29843

(43) International Publication Date: 22 December 1994 (22.12.94)

(21) International Application Number:

PCT/US94/06243

(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CN,

CZ, DE, DK, ES, FI, GB, GE, HU, JP, KG, KP, KR, KZ,
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(AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC,
NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,
GN, ML, MR, NE, SN, TD, TG).

(22) International Filing Date:

3 June 1994 (03.06.94)

(30) Priority Data:

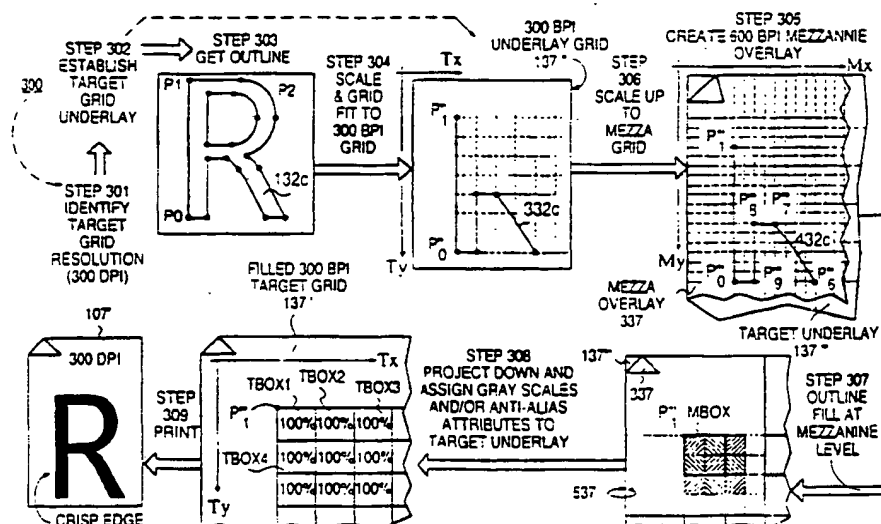
074,754

10 June 1993 (10.06.93)

US

(71) Applicant: APPLE COMPUTER, INC. [US/US]; 20525 Mari-
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Published

*With international search report.**Before the expiration of the time limit for amending the
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and Lovejoy, Suite 400 - Four Embarcadero Center, San
Francisco, CA 94111-4156 (US).(54) Title: ANTI-ALIASING APPARATUS AND METHOD WITH AUTOMATIC SNAP FIT OF HORIZONTAL AND VERTICAL
EDGES TO TARGET GRID

(57) Abstract

The invention provides a method and apparatus for creating anti-aliasing effects in slanted or curved edge portions of a bit-mapped image while avoiding such effects at horizontal and vertical edge portions. A method in accordance with the invention comprises the steps of: (a) defining a set of plot instructions for plotting an ideal outline of a desired image; (b) identifying a target resolution to be provided by a bit-mapped rendering apparatus; (c) scaling and grid-fitting the outline to the identified target resolution; (d) upwardly scaling the grid-fitted outline to a mezzanine resolution level that is higher than the identified resolution of the target display medium; (e) filling the outline at the mezzanine resolution level (scan conversion); (f) assigning, based on the mezzanine level outline fill, one or more of a grayscale value or other anti-aliasing attribute values to each corresponding pixel of the target display medium (sampling); and (g) rendering the image in accordance with this attribute assignment onto the target display medium for appreciation by a human observer.